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Total Quality Management in Higher Technical Education

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Abstract: ***The paper determines the behavior of Indian Technical Educational through the Total quality management tools and techniques, in this we tend to find the research gaps by reviewing some already existing research papers, and giving the solution through the analytical process of data analysis, we will majorly focus on the higher educational institutions. we will review the methodology that is currently being used by universities and how can they come at par as compared to the foreign universities. The reviewed papers will be used to find the shortcomings of the research and will be taken into consideration of analyzing it. Then we will be doing the quantitative data analysis of some collected data from google form and internet sources regarding the six TQM factors that influence the enrolment and hence the quality of institutions and determining the hypothesis result, then we will discuss the results and shortcomings of the analysis and will bridge those shortcomings by providing various possible solutions in that regards. In the whole process we have used data gathering, analyzing it and hence giving the solution. We have basically used IBM SPSS AND AMOS software to construct TQM models and their covariance relations. Now the future aspect of this paper is confirmed that the same procedure can be adopted to any industry for analyzing the quality of that organization.***

Index Terms: Total Quality Management, Technical Institutions, AMOS & SPSS.

I. INTRODUCTION

"Quality" is a relative word, a multifaceted concept that is contingent on the viewpoint of the consumer and the supplier. Usability (from a user-based perspective), requirement compliance (from a manufacturer-based perspective), gradation of penchant (from a value-based perspective), and gradation of perfection (from an excellence -based perspective) are all ways that quality may be communicated (transcendental approach). The level of the produced product's ability to confirm the design requirements is referred to as its conformance quality. [1-6]

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A. Quality in terms of educational system

A good education is one which provides all students with assistance that they require to become economically productive, sustainable lives and contribute to peace and democratic societies and enhance individual well-being. Quality in education is one which can provide desired knowledge and understanding in respective field. Learning outcomes vary according to different objectives or goals which can be classified under TQM goals, but at the end basic education must include initial levels of literacy, basic science knowledge and life skills learning including all basic required trainings [7-9]. Moreover, other stake holders of education and teachers' quality should be improvised.

B. Education Scenerio in India

India is a place in the world which holds a good rank in world education industry. India is also a home for many foreign international students, with more than 260 million students,760 university and 35,537 colleges. India has biggest advanced educational systems. But there is still a scope of growth in and around by implementing new policies [10]. But projected is the good growth ahead coming in recent years and India will become the biggest industry in world by expanding its ties and network worldwide.[11]

C. Primary Education

Lower elementary (Class I–V) and Upper Primary (Middle School, Class VI–VIII) are the two divisions of elementary education in India. For children between the ages of 6 and 14, the Indian government places a strong focus on primary education (Class I–VIII), often known as elementary education. The elementary school visits vary between Indian states since education rules are determined by the governments [12]. In order to prevent children from working in hazardous settings, the Indian government has officially outlawed child employment. Due to social injustice and economic inequality, it is challenging to implement both the right to free education and the prohibition on child work. At the primary level, 80% of all certified schools are managed or sponsored by the government, making it the biggest sector.

II. SECONDARY EDUCATION

Secondary education covers children aged 14 to 18, a group comprises of millions of children. The last two years of secondary is often called Higher Secondary (HS), Senior Secondary.

The two of secondary education are each an important stage for which passing certificate is necessary, hence are affiliated by boards of education under education ministry, before one can pursue higher education, including college or professional courses. [13]

III. HIGHER TECHNICAL EDUCATION

From the early five-year plan, India's focus was to develop a pool of scientific and technologically inclined power. India's National Policy on Education (NPE) has a prove for an apex body for regulation and development of higher technical education, which came into being as the (AICTE) in 1987 through an act of the Indian parliament. At the central level, the Indian Institute of Technology, the Indian Institute of Space Science and Technology, the National Institute of technology and the IIIT are deemed of national importance. according to one study, 75% of technical graduates and more than 85% of general graduates lack the skills needed in India's most demanding and high-growth global industries such as Information Technology[14]. As the government has made so much efforts for the upliftment of the higher technical education. So, it is important to figure out if the goal which are set out by the GOI can be accomplished. The method of Total quality management can link the goal of TQM with the Critical success factor and based on hypothesis testing we can figure it out if the desired model can be used to figure out the actual implication based on data collected.

A. Need for the Research

Basically, our review work in the thesis shows that there are ample of researchers who have contributed in the field of higher education quality management and have done the qualitative analysis which uses country, ministry information. Thus, they lack the quantitative part of the study. We have collected data from different universities(technical) and have done the quantitative analysis on the same.

IV. METHODOLOGY

A. Conceptual Development and Research variables

The use of mediation analysis as a tool for determining the causal pathway(s) that connect an independent variable and a dependent variable via the use of an intermediary variable has become more common (s). yet, when the intermediate variables (mediators) are high-dimensional cross-functional and the result is a survival endpoint, there has been very little research done in this area. this work makes an effort to model [15,16]. a complicated structure of a TQM system and link the critical success factors with the performance of the system in order to provide credible evidence for the hypotheses of interest. this questionnaire has been developed for the purposes of research in order to carry out a survey and gather data for the goal of analyzing the impact of csf's on the performance of TQM using amos 22 software.

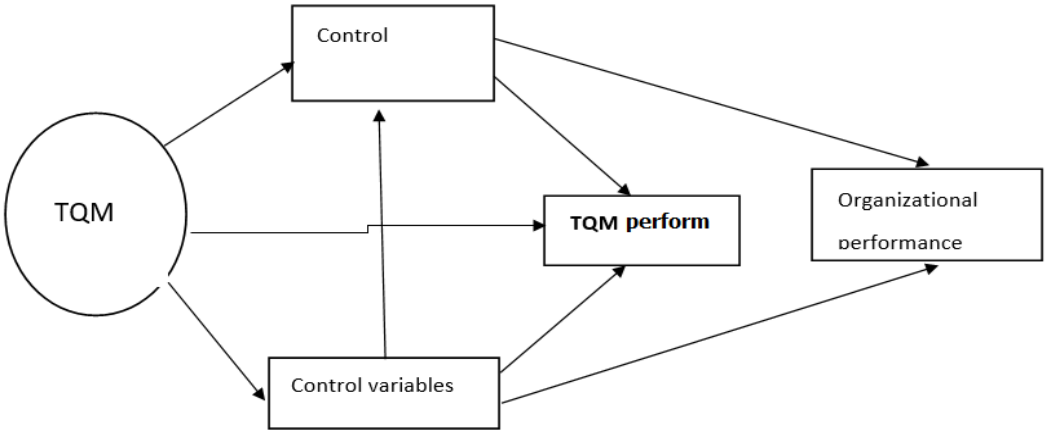

Fig. 1- The basic usage of structural equation modelling (SEM) in path analysis with mediation

The survey was given to two hundred and fifty students attending a variety of educational institutions in India. There was a total of 150 people who responded, and out of those 150 replies, 20 responses were eliminated because their answers were insufficient. Because of this, the total number of participants in the sample for this study is 130, and the percentage of response was 52%. Both the primary data (quantitative) and the secondary data (data obtained from already existing sources such as books, papers, websites, reports, and journals) were gathered. The primary data were obtained via the use of a targeted questionnaire consisting of structurally targeted questions. The secondary data was discovered to be a rapid, readily accessible, and low-cost method of gathering data that might be used to further characterize the issue. According to the findings of the examination of the reliability of the questionnaire in its whole, the Cronbach's value for the questionnaire as a whole is 0.891, which is very near to 0.9, indicating that the questionnaire has a high degree of reliability.

If the value is more than 0.8, then the reliability of the questionnaire is very excellent. If the value is between 0.8 and 0.9, then the reliability of the questionnaire is good. In general, people consider that the questionnaire's reliability must be better than 0.5 in order to be rational. At the same interval of time, the calculated Cronbach's magnitude of each and every influential component is more than the value 0.6, which indicates that the credibility and dependability of each and every influential factor is improving as well.

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The purpose of this study is to establish connections between many distinct categories of data. Data on TQM performance at three engineering institutions in India, namely DTU, NSIT, and Jamia Millia Islamia, is collected via the use of questionnaires. Answers are provided in a five-point Likert scale. The data we collected on TQM drivers and enablers, which, after being combined, were referred to as important success factors. These criteria included the Quality of Education (QE), infrastructure, Students and faculties, and Placements [17]

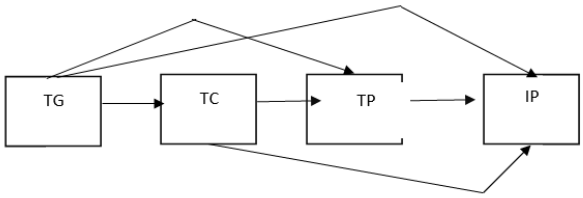

Fig. 2- Relations between TQM Goal (TG), TQM CSFs (TC), TQM Performance (TP) and Institutional Performance (OP).

These three assumptions—the relationship between TC-OP, TP-OP, and TC-TP confounding—essentially equivalent to controlling for the variables TQM Goal in Figure which corresponds with the variables that are found in the TC-OP, TP-OP, and TC-TP categories, respectively. In actual fact, it's possible that some of the variables will have an effect on all of the TG, TC, and TP, and the covariates themselves could have an effect on one another. There are no issues with any of this, and the covariate groups that are being studied do not need to be differentiated from one another. The fact that the variables that were included in the regression models described above were enough to adjust for TC-OP, TP-OP, and TC-TP confounding is very relevant [18]. For assessing high-dimensional mediation hypotheses, we use a process called Structural Equation Modelling (SEM) to evaluate the links between TQM Critical Success Factors and TQM Performance Variables. In order to complete this section of the task, the structural equation modelling (SEM) application known as Amos is used

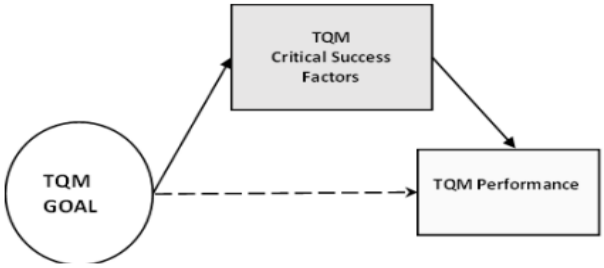

Fig. 3- proposed research model

As we know that the organizations have certain goal which they tend to accomplish. Our study aims at defining the CSF (critical success factor) in which we categorize the TQM drivers to main TQM factors (TQM enablers) this helps us to reduce the amount of data Using this method to recognize a domain has led to the development of many specific approaches; however, the majority of these approaches entail much more strict rules on data generation, variabilities, and observability of all relevant information than in typical cases. This is because SEM seeks to understand domains, not just the causal relationships between different variables. With sufficient sample sizes, structural equation modelling (SEM) has the potential to be one of these methodologies since it enables the modelling of behavioral complexity such as model loops, cross-lagged effects, autocorrelation structures, and so on [19]. The versatility of structural equation modelling (SEM) is one of its advantages. This flexibility makes it possible to examine intricate relationships, make use of many kinds of data (such as category, dimensional, censored, and count variables), and compare several alternative models. On the other hand, due to the characteristics of SEM, it is impossible to formulate broad standards about the needs for sample size (MacCallum et al. 1999). The success of any system, or more accurately, of any organization in relation to its goals, may be determined via performance assessment. Measurement of performance is a process-focused strategy that connects the performance of vital processes to strategic objectives by measuring and improving what is most important to a company. This is accomplished via the use of performance metrics. Establishing dimensions and keeping track of everything are the two most important aspects of measurement. According to Oakland (2003), in order to acquire accurate measurements of the efficacy of TQM, it is necessary to investigate all three aspects of TQM: the human, the technical, and the commercial aspects. Monitoring the effects of “Total Quality Management” (TQM) may be accomplished by analyzing many aspects of performance with the assistance of crucial success criteria, which are chosen on the basis of the TQM target [20-25]. “Total Quality Management” (TQM) is a dynamic system that may be tamed, as described by Pirsig (1991), and its dynamism is directed and controlled by its key success factors or critical success factors (CSFs), which are assigned as a combination of their drivers and enablers. The drivers and facilitators of “total quality management” differ from one organization to another depending on the aim that is being pursued. The drivers are the constructions that will define not only the performance level of TQM but also the performance level of the company. The empirical drivers, such as education and training, as well as the TQM drivers, were made possible by the enablers. Enablers are there to help ensure that the system's drivers continue to be dynamic so that continual development may take place. Since enablers are regarded to be variables, it is possible to preserve consistency even while using them.

The elements that were rigorously analyzed and shown to be responsible for the success of the system in question in terms of achieving the intended aim are considered crucial success factors of that system. After an explanation of how the research variables were operationalized and quantified, this part provides a short description of the sample and an overview of the survey process that was employed in this study. It was decided that the best way to gather data would be via a survey. Just one step of data collecting was carried out, and that was the questionnaire survey phase.

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The study is carried out primarily at two engineering institutions: the Netaji Subhas Institute of Technology and the Delhi Technological University (Delhi Technological University). The final sample contained responses from these and other other institutions as well.

Table1: characteristics of the responding institutes

Institute name	Students participated
Delhi Technological University	152
Netaji Subhash Institute of Technology	60
Jamia millia islamia	25
Others (VIPS, DU colleges, VIT, etc)	13

V. RESULT AND DISCUSSION

Now Let Us Discuss The Model And Check The Reliability Of The Hence Got Model

1) **Reliability of the Model- Cronbach's Alpha Value**

Reliability Statistics

Cronbach's Alpha	N of Items
.896	22

- Basically, this provides the inter-consistency of the model so as to how the inter questionnaires are linked with each other.
- The Cronbach alpha value for our model came out to be 0.896 which is considered to be a very good result so our model is internet-reliable.
- For seeing the reliability of each TQM driver we have a table of (if item deleted) that was not up to the mark for that we deleted four drivers from the analysis these are-I5,O2,Q6,P4 and then the results were excellent.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q1	78.16	87.236	.625	.603	.888
Q2	78.03	88.782	.525	.545	.891
Q3	78.01	88.014	.554	.544	.890
Q4	77.94	87.620	.576	.739	.889
Q5	78.14	87.429	.581	.639	.889
I1	78.04	86.650	.558	.614	.890
I2	78.21	85.794	.612	.827	.888
I3	78.20	88.336	.524	.709	.891
I4	78.41	87.898	.542	.694	.890
I6	78.26	89.121	.524	.509	.891
I7	78.10	88.671	.515	.554	.891
S1	78.14	88.269	.416	.663	.894
S2	77.91	87.268	.497	.657	.892
S3	78.17	90.985	.315	.566	.896
O1	78.07	90.125	.459	.519	.892
O3	77.81	89.400	.436	.636	.893
O4	77.91	88.427	.530	.580	.891
O5	78.01	88.507	.550	.729	.890
O6	78.01	90.681	.377	.634	.894
P1	77.96	88.621	.475	.643	.892
P2	78.30	91.025	.406	.513	.894
P3	77.97	89.419	.467	.533	.892

Fig. 4-Scale & Correlated Table

A. Factor Analysis

For factor analysis we used spss dimension reduction techniques so that we can suggest if the csf are in a good place to show the reliability of the model/questionnaire results Process-

1. All the questions were taken and later the questions which failed the reliability were deleted.
2. Rotation type was chosen to be varimax.
3. Scale items were also chosen (original vs if deleted)

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Basically, this is the proportion of each variable's variance that can be explained by the factors (e.g., the underlying latent continua). It is also noted as h2 and can be defined as the sum of squared factor loadings for the variables.

- The communalities of each question were above 0.5 suggest that nothing is wrong in the communalities
- Before removing the unwanted questions according to the reliability factor, we had the result of worst but after removing the unwanted we got very good result as shown in table on the left-hand side.
- Now only this test cannot give the only result we want, for that one needs to check many more parameters. And for the adequacy of the model, we used KMO test.

B. Kmo And Bartlett's Test

- KMO's measure of the sampling adequacy is a test performed to assess the appropriateness of accepting factor analysis on the data set available. Additionally, Bartlett test of sphericity is applied to test the null hypothesis that the different variables in the population correlation matrix are not correlated.
- KMO AND BARTLETT TEST THRESHOLD VALUES - KMO value of over 0.5 and a visible significance level for the Bartlett test below the value of 0.05 suggests there is considerable correlation in the data.
- Now as far as our data is concerned, it consists of a large number of inputs and it gives us near accurate results.

The Kaiser-meyer-olkin measurement of the sampling adequacy = 0.752(well above the threshold) bartlett test of sphericity-approx. = 788.499, ∂f = 231.Based on correlations it is a very good score.

C. Scree Plot

A scree plot is a line plot that shows the eigenvalues of the factors or main components in an analysis. This kind of graphic is used in multivariate statistics. While doing an exploratory factor analysis or a principal component analysis, the scree plot may be used to ascertain the number of factors or principal components that should be maintained in the investigation.

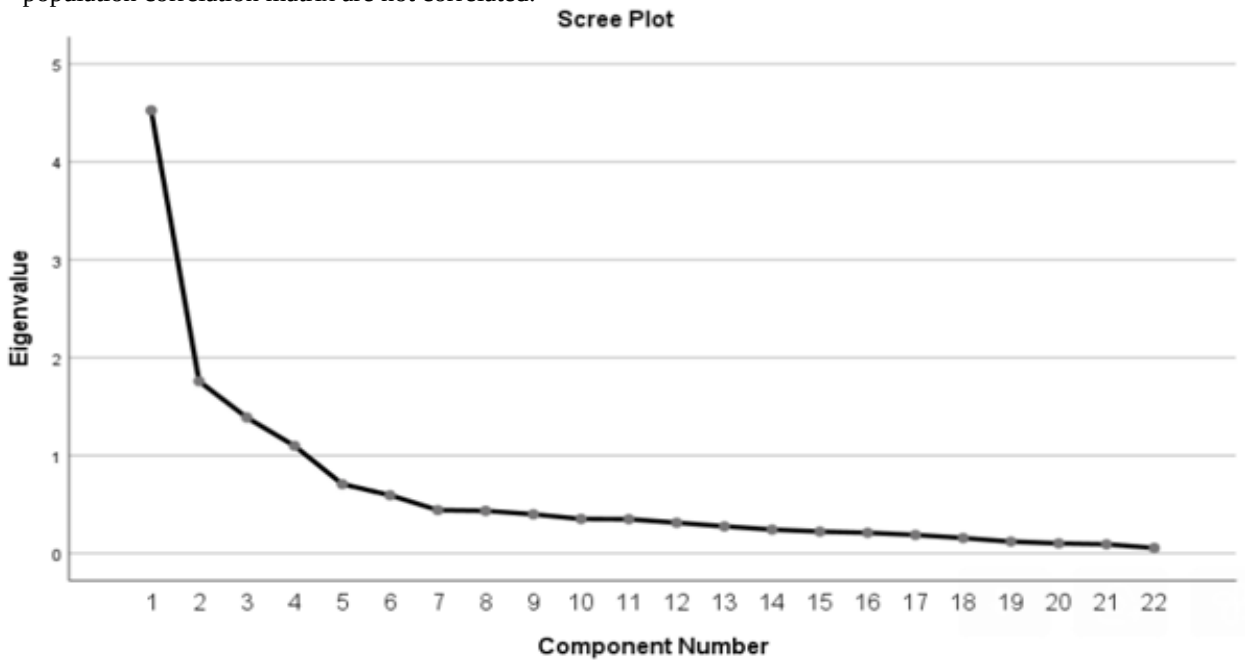

Fig. 5 Scree Plot

The following graph shows the relationship between the Eigenvalue and the number of components; in our example, there are 22 components in the questionnaire. A decent scree plot has a graph that has a downward slope and is formed like an elbow; this is one of its defining characteristics.

VI. ROTATED COMPONENT MATRIX

You will be able to determine what the components stand for with the help of the rotated component matrix. The first component has the highest degree of correlation, whereas the succeeding components have a lower degree. The major outcome of principal components analysis is the loadings, which are also frequently referred to as the loadings. It includes estimates of the correlations that exist between each of the variables and the components that have been calculated. We can see that all of the capabilities of TQM are connected with each other in this image, and this is done entirely by spss with no interference. This is the case in our particular scenario. This leads us to believe that if we rotate our system or collection of questions, they will remain tightly associated under one head, such as I with all I's alone, O with O's only, and not with any other variable.

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Raw

	Component				
	1	2	3	4	5
I4	.692				
I2	.761				
I3	.600				
I1	.639				
I6	.384				
I7					
O6		.598			
O4		.586			
O5		.552			
O3		.597			
O1		.466			
Q4			.670		
Q5			.526		
Q1			.481		
Q3			.485		
Q2			.432		
S1				.841	
S2				.749	
S3				.665	
P3					.605
P1					.655
P2					.473

Fig. 6- Rotated component matrix

VII. CONFIRMATORY FACTOR ANALYSIS

Once one has a conceptual model which is a simple sketch on a paper with arrows pointing between the variables showing how influences predicts, one may proceed to the "testing". CFA is accomplished with SEM. Once you have the conceptual model, you can attain CFA with SEM. And now the person has to deal with the sort of SEM which is appropriate for testing. One further angle from which to examine this problem is to begin with the various modelling approaches. PLS modelling or covariance-based modelling are two options that are available to us. It goes without saying that we would not continue testing or creating models just because EFA indicates certain fundamental structures. Rather, your EFA should first be guided by a number of dogmatic or theoretical considerations. The meanings of the symbols in this graphic may be found in their respective definitions. The newly formed representations are the functions that give a generic method which expresses the relationships between the involved variables that are included inside the parenthesis and those that are located on the left-handed side of every node.

This is an early model that was fit using the rotated component matrix in the study; it was created using those data. But, at this point, we are interested in determining whether or not this model is appropriate when it is associated with the TQM enablers (five of them in our instance), i.e. As we are primarily interested in analyzing technical schools, the areas of focus will be on the Quality of Education, Infrastructure, Students and Faculty Information, Other General Aspects, and Placements.

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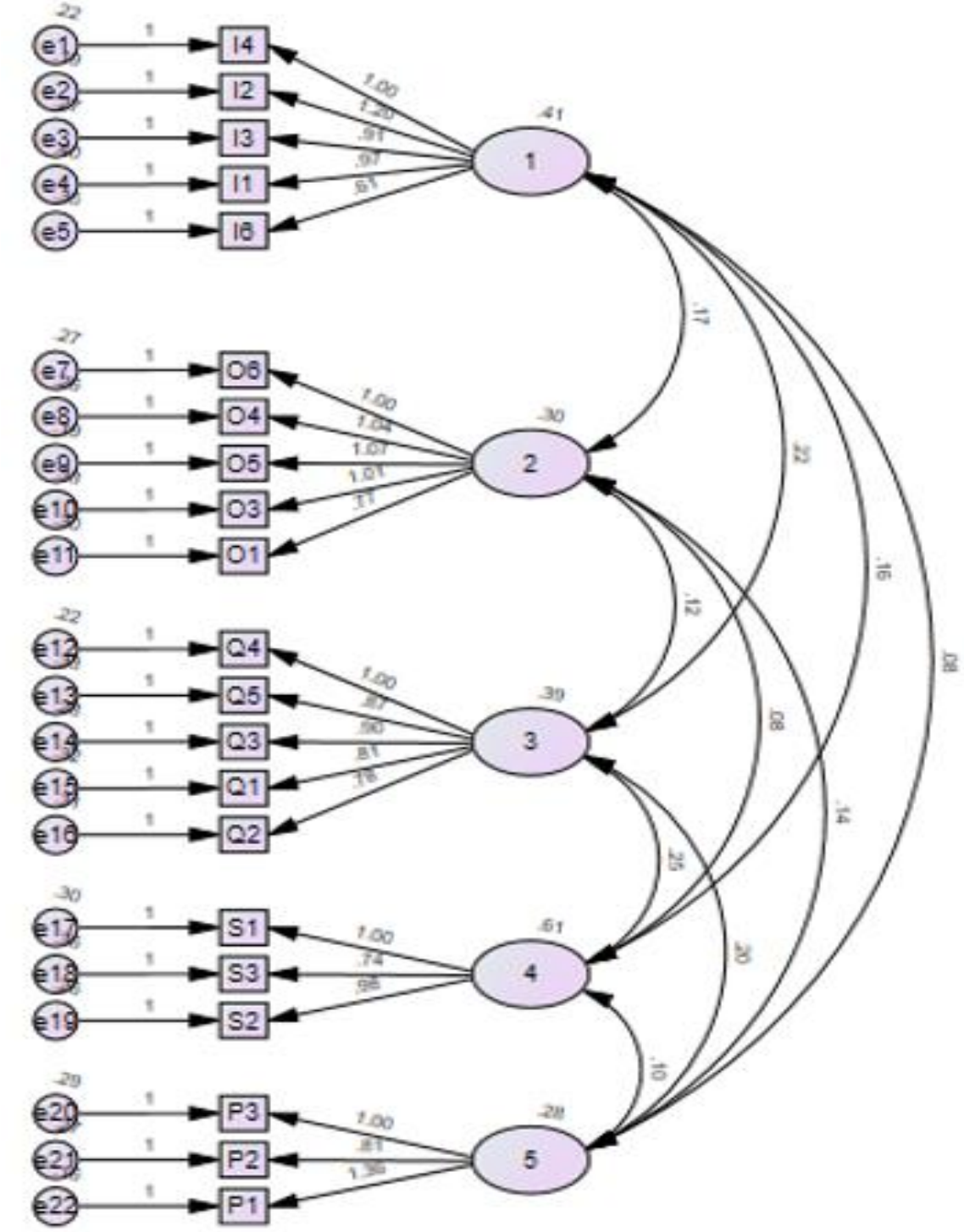

Fig. 7- Confirmatory Factor Analysis

This is an early model that was fit using the rotated component matrix in the study; it was created using those data. But, at this point, we are interested in determining whether or not this model is appropriate when it is associated with the TQM enablers (five of them in our instance), i.e. As we are primarily interested in analyzing technical schools, the areas of focus will be on the Quality of Education, Infrastructure, Students and Faculty Information, Other General Aspects, and Placements.

This model establishes a connection between the aforementioned fit model and the many TQMs that fall under the umbrella of the five TQM enablers. I, O, Q, S, and P (numeric) are the different drivers, and they are directly tied to their respective headings. The headings, in turn, are related to the overall performance of the institution or the primary TQM aim, which is related to the numerous TQM enablers head (i.e., I, O, Q, S, and P). TQM1, TQM2, TQM3, and so on. Since the majority of our data came from Delhi Technological University, we compared it to that of other reputable universities from around the world that are ranked similarly to our own institution.

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The table that follows provides a comparison between DTU and other institutes from around the world in terms of teaching and research, which was identified as the most prevalent TQM DRIVER in our analysis. DTU received certain low scores and has a lot of room for improvement in both of these areas, but the university is making progress in both areas, according other requirements include making steady progress towards improvement and, in the not-too-distant future, competing on an equal footing with the nation's leading educational institutions.

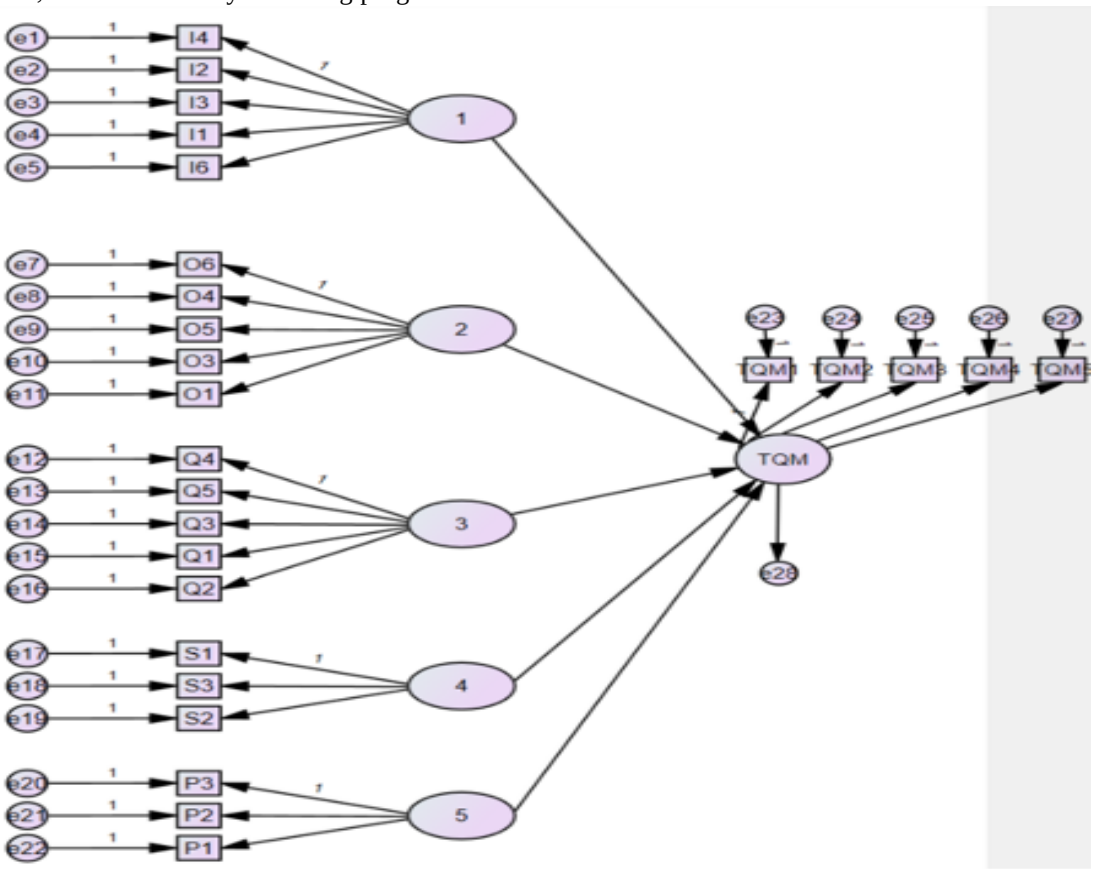

Fig. 8- linkage enablers vs. drivers

Now as we have explained the model and their linkage now it's the time when ve see if this model well fits the analysis or not. For model being fit it has to be passed through some cut-off criteria. Lets see that vs. our scores in front of it

Cutoff Criteria*

Measure	Terrible	Acceptable	Excellent
CMIN/DF	> 5	> 3	> 1
CFI	<0.90	<0.95	>0.95
SRMR	>0.10	>0.08	<0.08
RMSEA	>0.08	>0.06	<0.06
PClose	<0.01	<0.05	>0.05

Fig. 9- cutoff criteria for model fit

Measure	Estimate	Threshold	Interpretation
CMIN	229.138	--	--
DF	179.000	--	--
CMIN/DF	1.280	Between 1 and 3	Excellent
CFI	0.920	>0.95	Acceptable
SRMR	0.084	<0.08	Acceptable
RMSEA	0.064	<0.06	Acceptable
PClose	0.188	>0.05	Excellent

Congratulations, your model fit is excellent!

Fig. 10- our model fit or not

This we have found out that our hence produce model was fit and the factors were accordingly placed with the ratings received through questionires.

Table 2 – influence of inividual factor linkage

Estimate p value result	linkage
.662 *** Fail to reject	Infrastructure→ tqm1
.573 *** Fail to reject	Quality education→ tqm2
.509 *** Fail to reject	Student faculty info→ tqm3
.475 *** Fail to reject	Important aspects→tqm4
.438 *** Fail to reject	Placements→ tqm5

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Fig. 11, 12-Research score and teaching score with near ranked college

As we have collected data majorly from Delhi technological university we have compared the data with the world wide good universities which possess near ranking with our university.Above is the comparison between DTU and other worldwide institutes in terms of teaching & research which is the most prevalent TQM DRIVER in our analysis which got certain low scores and need to be improved but DTU is improving in terms of both as further analysis suggest that delhi technological university has approximately all the teaching staff who are well versed in their PHD and are well qualified in the respective fields also as far as research is concerned many programs are bring run in the university. further needs are to continuously work towards improving and make it stand head to head with top institutes in near future.

VIII. CONCLUSION

Our model of analysis passed all the testing's and can be used to examine the quality management of any institution or organization. Moreover, we found that these factors help understanding the real time demand of the students and attempts can be made to fulfill them. In our attempt to find out the success criteria we found that real-time data collection is very essential. The changes in economics, society, culture, and technology all contribute to the development of the knowledge society. If India were to become a superpower in the knowledge sector, this would allow for a significant acceleration of the current rate of economic development. In this respect, we have made an effort to examine by collecting data and analyzing it using the software IBM SPSS AND AMOS. As a result of these efforts, we discovered that statistical methods are effective for analyzing and forecasting the nature of the input provided by the general population. In our study, the primary emphasis was on establishing a connection between quality management and essential success criteria, and we also conducted an in-depth examination of the primary elements that, if addressed, may result in a significant improvement for the organization.

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The implementation of total quality management inside the company enables the company to realize greater levels of productivity and success by honing in on the most effective means of accomplishing their objectives. In order to conduct a successful study of the students' actions, we relied on reliability factors and model fit analysis. A conceptualized TQM model for achieving excellence in higher education institutes is suggested, and is dependent on the following characteristics, all of these lead to satisfied students.

DECLARATION

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Conflicts of Interest/ Competing Interests	No conflicts of interest to the best of our knowledge.
Ethical Approval and Consent to Participate	No, the article does not require ethical approval and consent to participate with evidence.
Availability of Data and Material/ Data Access Statement	Not relevant.
Authors Contributions	All authors have equal participation in this article.

REFERENCES

1. Pravin kumar (2015) Industrial Engineering and Management, Delhi Technological University.
2. Bollen, K. A. (1989). Structural equations with latent variables. New York: Wiley. [CrossRef]
3. Bolwijn PT, Kumpe T. (1990). Manufacturing in the 1990s—productivity, flexibility, and innovation. Long Range Planning, 23(4), 44–57. [CrossRef]
4. Brotherton, B., & Shaw, J. (1996). Towards an identification and classification of critical success factors in UK hotels Plc. International Journal Hospitality Management, 15(2), 113-135. [CrossRef]
5. Claver, E., Tari, J.J. and Molina, J.F. (2003), "Critical factors and results of quality management: an empirical study", Total Quality Management and Business Excellence, Vol. 14 No. 1, pp. 91-118. [CrossRef]
6. Demirbag M, Tatoglu E, Tekinkus M, Zaim S. (2006). An analysis of the relationship between TQM implementation and organizational performance: Evidence from Turkish SMEs. Journal of Manufacturing Technology Management, 17(6), Pp. 829–847. [CrossRef]
7. https://economictimes.indiatimes.com/industry/services/education/budget-2023-education-gets-highest-ever-allocation-share-in-gdp-remains-stagnant-at-2-9/articleshow/97534802.cms. *Retrieved 5 March 2023.* {{cite web}}: Missing or empty |title= (help)
8. *"India Literacy Rate". UNICEF. Retrieved 10 October 2013.*
9. *Kumar, Vinay (31 March 2011). "Census 2011: population pegged at 1,210.2 million". The Hindu. Retrieved 9 April 2021.*
10. Jump up to:[a] [b] *"World Development Indicators: Participation in education". World Bank. Retrieved 21 August 2014.*
11. *"Education in India". World Bank. Retrieved 9 April 2021.*
12. Jump up to:[a] [b] [c] *"Educational Statistics At a Glance – Government of India" (PDF). education.gov.in. Retrieved 17 March 2021.*
13. *Kingdon, Geeta Gandhi (2 October 2020). "The Private Schooling Phenomenon in India: A Review". The Journal of Development Studies.* ***56*** *(10): 1795–1817. doi:10.1080/00220388.2020.1715943. ISSN 0022-0388. S2CID 158006322.* [CrossRef]
14. *Little, Angela W.; Lewin, Keith M. (11 July 2011). "The policies, politics and progress of access to basic education". Journal of Education Policy.* ***26*** *(4): 477–482. doi:10.1080/02680939.2011.555004. ISSN 0268-0939. S2CID 145170025.*^ NSO 2018, pp. 43. [CrossRef]
15. Dixon, J.R., Nanni, A.J., Vollmann, T.E. (1990). The new performance challenge: Measuring operations for world-class competition, Homewood, IL, Dow Jones-Irwin.
16. Kumar, V., Choisne, F., Grosbois, D. and Kumar, U. (2009) Impact of TQM on Company's Performance. International Journal of Quality & Reliability Management, 26, 23-37. https://doi.org/10.1108/02656710910924152. [CrossRef]
17. Venkatraman, S. (2007) A Framework for Implementing TQM in Higher Education Programs. Quality Assurance in Education, https://doi.org/10.1108/09684880710723052. [CrossRef]
18. TOTAL QUALITY MANAGEMENT IN HIGHER EDUCATION: A REVIEW Naveen Kumar Research Scholar Department of Commerce, M.D.U, Rohtak, Haryana, India
19. Barros, S., Sampaio, P., and Saraiva, P. (2014). The Relationship between Quality Approaches and their Impact on Portuguese Companies´ Quality Performance", International Conference on Industrial Engineering and Operations Management, Bali, Indonesia.
20. Kumar, s.(2009). Total Quality Management. New Delhi: University Science Press. [CrossRef]
21. R.S. Mishra, Rakesh Kumar, Effect of mediation using critical success factors in the TQM fororganizational performance evaluation, International journal of research in engineering and innovation (IJREI), vol 5, issue 6(2021), 387-396. https://doi.org/10.36037/IJREI.2021.5607
22. National Assessment and Accreditation Council (NAAC), 2004. Guidelines for Re- Accreditation, Bangalore: NAAC, Retrieved from: http://uphed.up.nic.in/sNAAC- N.pdf
23. Sangeeta, et al., 2004. Conceptualising total quality management in higher education. The TQM Magazine, 16(2): 145-159. [CrossRef]
24. Srivanci, M.B., 2004. Critical issues for TQM implementation in higher education. The TQM Magazine, 16(6): 382-386 [CrossRef]
25. Wing, C. (1998). Applying Total Quality Management to the Educational Process. Int. J. Engng Ed, 14(1),

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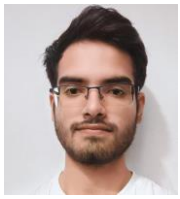

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